NAVAL STRIKE AND AIRWARFARE CENTER

UAV CONOPS

INITIAL REVIEW

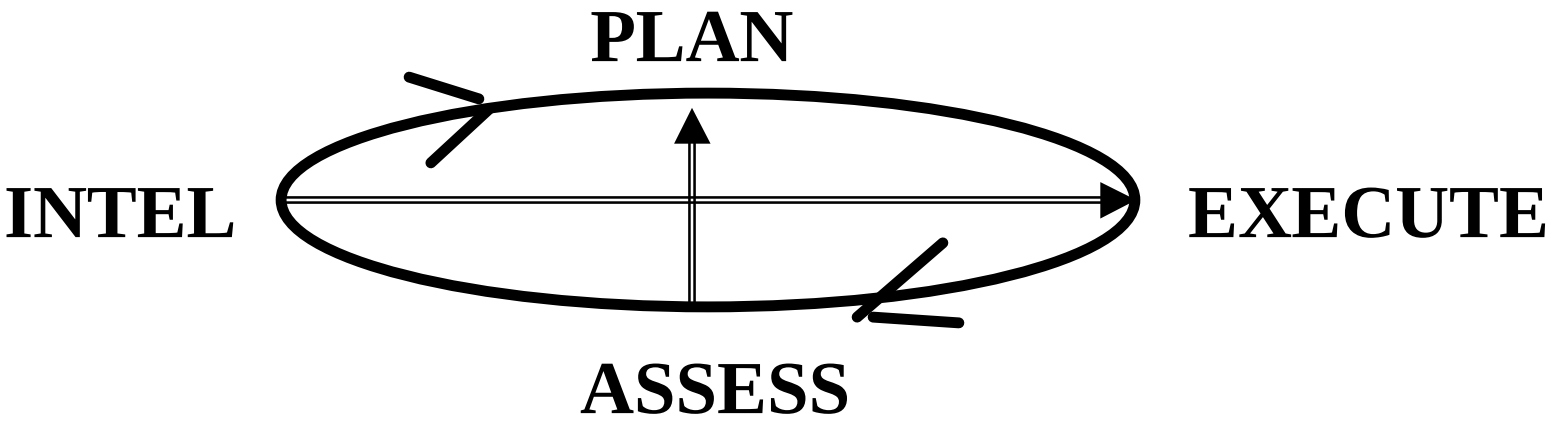
Overview

- Background of CONOPS Project
- C4I Lessons Learned / Requirements
- Naval UAV mission areas
  - Tactics / Integration / Value Observed
    - Lessons Learned
    - Requirements Generated
  - Potential Tactics / Integration

Why pursue UAV Strike Warfare Integration?

- UAVs can provide unique Real Time / Near Real Time Tactical Intelligence and Strike Support
  - Offset gaps in tactical intel
  - Assist in target acquisition / designation
- UAV technology is mature and there are multiple systems on the market
- TCS has the potential to make UAV integration into Naval / USMC operations seamless, significantly increasing their utility

Why pursue UAV Strike Warfare Integration?



The Bottom Line

To allow combat operation inside of the enemy's decision loop!

Challenges to UAV Strike Warfare Integration

- No current UAV is ideal
- UAV C4I is not integrated into shipboard and forward deployed unit C4I systems
- Integration procedures and training not yet developed
- Current US UAV systems support two ends of the warfare spectrum
  - Predator: Strategic Intelligence?
  - TUAV: Tactical Intel, single user?

Why Hunter at NSAWC

"CINCPAC supports COMNAVAIRPAC initiatives to incorporate Predator or Predator-like capability into the fleet. The initiative will broaden fleet familiarity and provide in-depth exposure to C4I, real time targeting issues, and new reconnaissance capabilities to meet mission needs across a broad spectrum."

NSAWC Tasking

To provide detailed Navy familiarization with UAV systems and hands on tactical concept of operations development in support of strike, special forces and fleet operations. (CNO N88, N85, NSAWC)

CONOPS Development Process

- UAV Working Group
- UAV CONOPS Tactical Flights and Exercise Integration:
  - FAM
  - Basic Operations
  - Desert Rescue
  - Silent Fury
  - CVW-14
- TCS Warfighter Planning Group
- USN UAV Operator’s Working Group

What is TCS?

- Tie to C4I links
- The universal UAV “virtual” control box
- Scalable to fit need / control

UAV C4I Integration / Planning:
Lessons Learned / Requirements

- For integrated strikes/spec ops, there needs to be a UAV advocate on the planning team who is familiar with both the caps / lims of the UAV system and the strike warfare units involved (combat aircrew or specop pers preferred)
- TCS should be located in an area that allows the operator to assimilate as much tactical information as possible from other sources (JMCIS, ACDS, Tactical radios)

UAV C4I Integration / Planning:
Lessons Learned / Requirements (Cont.)

- UAV C4I capability needs to exist on any ship that may need real time intelligence and / or coordinates strike warfare ops
- C4I must extend over the horizon, and function in a robust electronic attack environment
- UAV flight control should be automated such that very little effort and training are required for these functions

UAV C4I Integration / Planning:
Lessons Learned / Requirements (Cont.)

- Robust communications relay package:
  - SATCOM, UHF, VHF combinations with frequency management through the TCS
- TCS should automatically transfer data to/from JMPS and tactical data links
- With integrated planning, the UAV can be deconflicted with combat aircraft through altitude blocks and / or ROZ

UAV C4I Integration / Planning: Lessons Learned (Cont.)

- Link-16 integration could significantly improve ATC / PHID. Also, UAV Link-16 auto-relay of other Link-16 players would enhance battle management
- With planning and the right payloads, a single UAV can accomplish multiple functions during a single surgical strike (i.e. IW, counter CCD, SEAD effectiveness, EA, HA / BDA, CSAR)

UAV CONOPS Results to Date

- Mission Area
  - Tactics / Integration / Value Observed
    - Lessons Learned
    - Requirements Generated
      - UAVs
      - TCS
  - Potential Tactics / Integration
  - TCS distribution and level-of-control discussion

IMINT / ELINT / NBCINT

- INTEL, SURVEILLANCE, RECONNAISSANCE,
  - Desert Rescue route rehearsal
    - Routes of Helos and escorts
  - Lessons Learned
    - UAV can highlight cultural features that are not available on charts
    - Having a combination EO / IR sensor at night assisted in finding population centers

IMINT / ELINT / NBCINT

- TARGET ACQUISITION, COUNTER CCD CAPABILITIES
  - ITP / ATP counter CCD
    - Strike missions vs targets that have CCD
  - Lessons Learned
    - Intel just prior to strike can dramatically improve probability of hit
    - The target scene should be evaluated by an aircrew that would potentially strike it through the sensors in use, or
    - RTIC information to the strike aircraft

IMINT / ELINT / NBCINT

- BDA / HA
  - MLT / ITP Deep Strike events
  - Lessons Learned
    - The UAV can cover several targets in rapid succession *IF* the sensor operator is given an accurate time line of events and a chance to "rehearse" his coverage.
  - Requirements Generated
    - A TCS module that allows pre-programmed sensor pointing for multiple targets (both manual coordinate entry plus marks)

IMINT / ELINT / NBCINT

- IMINT in support of Spec ops
  - Scenario: POW Raid into combat village
  - Lessons Learned (cont)
    - The sensor operator needs to coordinate tactics and graphics with the specop unit during the planning stage
    - UAV comm relay allowed seamless UHF communications between the spec op forces and helos from over the horizon to pick up

IMINT / ELINT / NBCINT

- Visual/IR signature of targets, Funnel navigation assistance
  - Humbolt Power Plant Attack
  - Lessons Learned
    - When preparing video for target acquisition, (strike / CAS / SCAR), begin with a large area with a prominent land mark in view. Then pan / zoom to the target of interest.

IMINT / ELINT / NBCINT
(postulated)

- Weather / Contaminant reconnaissance and surveillance
  - Requirements Generated:
    - NBC sensors and reporting methodology
- Identification of critical elements (hot generators, hangars, barracks)
- Airfield Monitor / Bogey PHID

CSAR / NEO / MOOTW

- Desert Rescue and CVW-14 CSAR Events
  - Scenarios (immediate, preplanned)
- Lessons Learned:
  - On the battlefield, georefs (bearing/ range) from prominent landmarks are often used instead of coordinates
  - Navigation degrades can prevent UAV from pointing to assigned coordinates

CSAR / NEO / MOOTW

- CSAR Lessons Learned (cont):
  - Comm relay was the most significant value added of the UAV
  - With the proper communications package, the UAV has the potential for becoming the surrogate CSAR Rescue Mission Commander

CSAR / NEO / MOOTW

- CSAR Lessons Learned (cont):
  - Currently, aircrew do not fly with adequate IR signaling devices
  - Monitoring LOCs for aggressors / search parties may be best use of the UAV, after comm relay
  - Knowing where the enemy is not, may be just as valuable as knowing where the enemy is

CSAR / NEO / MOOTW

  - Once multiple eyeballs are in the LZ, the UAV should shift to monitoring elsewhere, (ex. egress route)
- CSAR Requirements:
  - Comm relay package
  - Infrared Zoom Laser Illuminator Designator (IR spotlight)
  - Light intensity optics (Low Light Camera)

CSAR / NEO / MOOTW

- Desert Rescue and CVW-14 NEO Events:
  - Extraction from B-17 combat village
- Lessons Learned:
  - UAV video to the ground commander allows monitoring of potential hostiles who are not visible from the embassy
  - Best use of UAV may be to monitor LOCs (highways/roads) to the embassy

CSAR / NEO / MOOTW

- Desert Rescue and CVW-14 NEO, Events, Requirements Generated:
  - Direct downlink of video to NEO commander in a man portable video receiver
  - Comm relay from NEO commander to sensor operator via UAV

CSAR / NEO / MOOTW

- Multiple CVW Urban CAS Events:
  - Both FAC(G) and aircrew receive UAV video and attempt to acquire targets in an extremely cluttered environment
- Lessons Learned:
  - RTIC video should pan / zoom from identifiable landmarks to small targets
  - Video needs to edited or orchestrated before transmitted to the aircrew

CSAR / NEO / MOOTW

- Multiple CVW Urban CAS Events, Requirements Generated:
  - Aircraft / UAV / TCS integrated RTIC system
  - Common comm link for FAC, Aircrew and UAV sensor operator

Best Quote of the Project to Date

"The UAV allows us to be extremely offensive in a defensive situation"

(i.e. . . . peace keeping, NEO).

LCDR Brurud

CAS / SCAR / SSC

- FAC/TACP asset
  - Scenario: FAC in B-17 with portable video system, RTIC system, UAV comm package, AWW-13 pod on F/A-18 aircraft
- Lessons Learned:
  - UAV allows FAC to see and strike over the horizon / behind obstacles
  - RTIC dramatically improves strike situational awareness along FEBA
  - UAV controller / sensor operator needs to be familiar with CAS procedures and terminology

CAS / SCAR / SSC

- Requirements Generated:
  - Direct video feed from UAV to FAC(G)
  - Direct video feed from UAV to strike aircraft, plus UAV comms between aircraft and payload controller
  - Infrared Zoom Laser Illuminator Designator (IR spotlight)

CAS / SCAR / SSC

- Target designation (w / laser or GPS)
  - Scenario: UAV conduct lasing for strike aircraft with LSTs, bombs or LGTRs
  - Scenario: UAV video mensurated on Precision Targeting Work Station and coordinates broadcast to strike aircraft

CAS / SCAR / SSC

- Lessons Learned:
  - Tactics demonstrated the ability of strike aircraft to drop laser guided munitions on a UAV designated target. Precision bombing through an overcast may be possible
  - By observing hits vs targets, UAV payload operator can walk striker to difficult to find (CCD, small) targets

CAS / SCAR / SSC

- Requirements Generated:
  - Laser with codes tunable through TCS
  - Laser control (on/off) from strike aircraft
  - Full automation of UAV coordinate mensuration process to support GPS munitions

SEAD / EA / ES / IW

- HARM/TLAM(C)/JSOW hit assessment
  - Scenario: During deep strikes the UAV would acquire a series of SAM sites and monitor IAW the HARM time line
- Lessons Learned:
  - UAV advocate needs to participate in the SEAD planning
  - UAV controller needs real time status of SEAD execution
- Requirements Generated:
  - Self protect EA may be required for the UAV

SEAD / EA / ES / IW (Potential)

- Electronic surveillance and/or attack
  - Off axis jamming
  - IADS stimulation
  - IADS saturation
- Monitoring mobile SAM systems
- Monitoring strategic SAM systems

Psychological Operations

- Communications deception
- Propaganda broadcast

Counter-Infiltration / Narcotics

- ID OF LOW, SLOW FLYERS OR BOATS (AW SUPPORT)
- DMZ/BORDER MONITORING (Vehicles/people)

Naval Surface Fire and Artillery Support

- Target Acquisition
- Fire correction
- Laser guided munitions
- GPS guided munitions

UAV Survivability

- SCENARIOS:
  - Manpads (Day and Night/NVD)
  - IADS Penetration
    - Baseline (no EA)
    - EA
    - Terrain Masking
    - Integrated with CVW Strike / CSAR operations
  - Air-to-Air

UAV Survivability (cont.)

- Lessons Learned:
  - MANPAD
    - SA-16 tracking
    - Manpad operators uncertain of UAV altitude / engagability
  - RADAR SAMS/AAA
    - Current UAVs are susceptible to third world threat systems.

UAV Survivability (cont.)

- Lessons Learned:
  - IADS DETECTION
    - Eluding the enemy's IADS pointing systems (search radars and visual observers) may be the best method for increasing the UAV's survival.
    - Slow speed works for and against detection:
      - For: UAV appears to be chaff / clutter
      - Against: IADS has multiple sweeps or "looks" to sort contacts.

UAV Survivability (cont.)

– Air-to-Air engagability

  • Visual acquisition difficult, slow speed made engagement difficult (guns / IR SAM)

UAV Survivability (cont.)

- Requirements:
  - Reduce “observability” (audible, visual and radar signatures). Higher Altitude?
  - Integrate a self protect jammer with off-board monitor / management.
  - UAV JMPS model plus auto data transfer to TCS
  - The Tactical and MAE UAV needs to be able to fly below line of sight to take advantage of radar terrain masking

Bottom Line

- UAVs demonstrate the potential to bring extensive tactical value to Military operations.
  - Better, more timely decisions made during combat operations
  - Increased kill per weapon employed
  - Less collateral damage
  - Reduced attrition
  - and much more!

For UAV Strike / Spec Op Integration to occur

- UAV control must be allowed as far forward deployed as possible.
- UAV operations must be integrated with USN/USMC C4I systems.
- UAV mission control should be dynamically tasked by personnel who are knowledgeable of the tactics, hardware, doctrine being executed, and were involved in the mission planning.

TCS Training Issues

- The UAV flight operator must be NATOPS qualified in the platform(s)
- Different levels of control required different levels of training / currency
  - TCS needs to break out level 3 from 4 on legacy systems.
- Knee in the UAV operator training curve needs further study, (Naval aviator or enlisted)

TCS Training Issues (Cont)

- TCS needs to be automated to:
  - Decrease flight workload
  - Support emergency / procedure decision making
  - Present / manage embedded training
  - Ensure qualification / sustain currency